

**Examen Computacional 2: Solución****% Ejercicio\_1**

```
%  
clear all  
xi=[65 55 45 35 25 15 5 -5 -15 -25 -35 -45 -55]';  
yi=[-3.1 -3.22 -3.3 -3.32 -3.17 -3.07 -3.02 -3.02 -3.12 -3.2 -3.35 -3.37 -3.25]';  
xx=[-55:0.01:65];  
xii=xi(1:3:end);yii=yi(1:3:end);  
N=length(xii);  
H=[ones(N,1),xii,xii.^2,xii.^3,xii.^4];  
c=H\yii;  
p_x=c(1)+c(2)*xx+c(3)*xx.^2+c(4)*xx.^3+c(5)*xx.^4;  
fi=40.40;p_fi=c(1)+c(2)*fi+c(3)*fi.^2+c(4)*fi.^3+c(5)*fi.^4  
  
p_xi=c(1)+c(2)*xi+c(3)*xi.^2+c(4)*xi.^3+c(5)*xi.^4;  
  
Error_1=sum((yi-p_xi).^2)  
subplot(311);plot(xii,yii,'gs',xi,yi,'go',xx,p_x,'g',fi,p_fi,'rs');
```

**% Ejercicio\_2**

```
%  
clear all  
xi=[65 55 45 35 25 15 5 -5 -15 -25 -35 -45 -55]';  
yi=[-3.1 -3.22 -3.3 -3.32 -3.17 -3.07 -3.02 -3.02 -3.12 -3.2 -3.35 -3.37 -3.25]';  
xx=[-55:0.01:65];  
N=length(xi);  
H=[ones(N,1),xi,xi.^2,xi.^3,xi.^4];  
c=H\yi;  
p_x=c(1)+c(2)*xx+c(3)*xx.^2+c(4)*xx.^3+c(5)*xx.^4;  
fi=40.40;p_fi=c(1)+c(2)*fi+c(3)*fi.^2+c(4)*fi.^3+c(5)*fi.^4  
  
r2=H*c-yi,[max_r2, i_r2]=max(abs(r2)),Error_2=sum(r2.^2)  
fi=40.40;p_fi=c(1)+c(2)*fi+c(3)*fi.^2+c(4)*fi.^3+c(5)*fi.^4;  
  
subplot(312);plot(xi,yi,'bo',xx,p_x,'b',fi,p_fi,'rs');
```

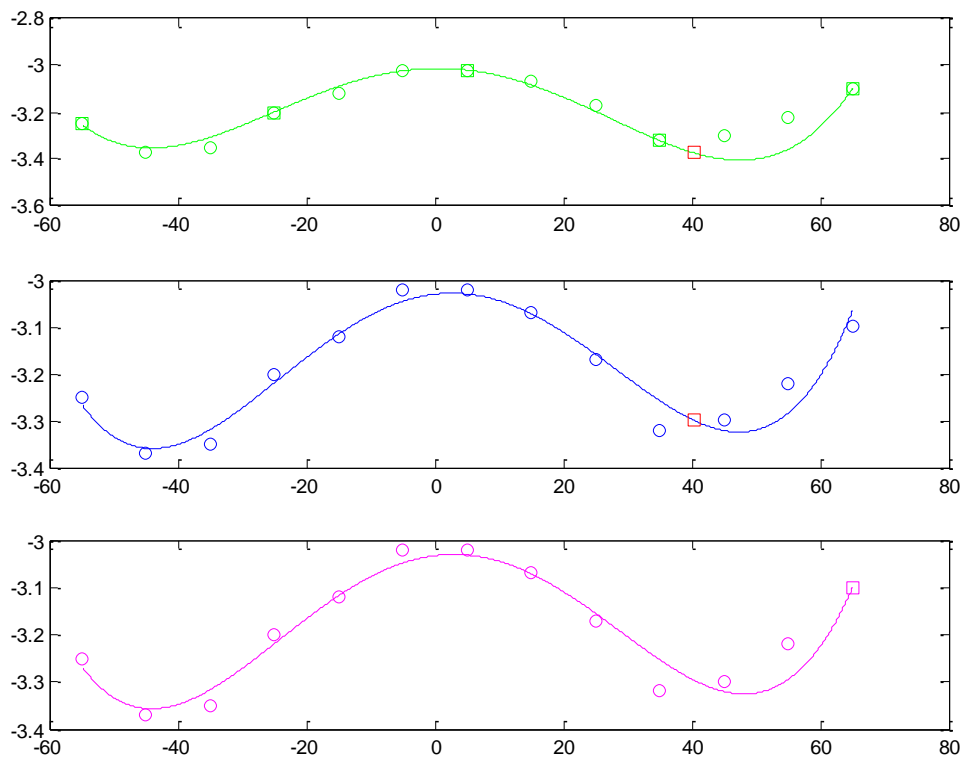
**% Ejercicio\_3**

```
clear all  
xi=[65 55 45 35 25 15 5 -5 -15 -25 -35 -45 -55]';  
yi=[-3.1 -3.22 -3.3 -3.32 -3.17 -3.07 -3.02 -3.02 -3.12 -3.2 -3.35 -3.37 -3.25]';  
xx=[-55:0.01:65];  
fi=40.40;  
  
x1=xi(1);xii=xi(2:end);  
y1=yi(1);yii=yi(2:end);  
  
H=[xii-x1, xii.^2-x1.^2,xii.^3-x1.^3,xii.^4-x1.^4];  
b=yii-y1;  
c=H\b;  
  
p_x=y1+c(1)*(xx-x1)+c(2)*(xx.^2-x1.^2)+c(3)*(xx.^3-x1.^3)+c(4)*(xx.^4-x1.^4);
```

```

p_xii=y1+c(1)*(xii-x1)+c(2)*(xii.^2-x1^2)+c(3)*(xii.^3-x1^3)+c(4)*(xii.^4-x1^4);
r3= y1i-p_xii;Error_3=sum(r3.^2)
subplot(313);plot(xii,y1i,'mo',xx,p_x,'m',x1,y1,'ms')

```



1. El Error:

Error\_1 =

0.03316916967264

2. La variación de la temperatura en la FI:

p\_fi =

-3.29930665697123

El vector residuo:

r2 =

0.03462831286361  
 -0.06477052359405  
 -0.02082505729565  
 0.06358935182465  
 0.01290297937357  
 -0.00114826350121  
 -0.00952283011107  
 -0.02587353822648  
 0.00345242992302  
 -0.02058647235118  
 0.03027384380326  
 0.01160310277957  
 -0.01372333548804

La máxima discrepancia se da en  $x_2$  :

max\_r2 =

0.06477052359405  
 $i_r^2 =$

2  
El Error:

Error\_2 =

0.01247474878063

La función  $p_2(x)$  se ajusta mejor a los datos que la función  $p_1(x)$ , ya que su error es menor.

3. El Error:

Error\_3 =  
0.01384987014468

La función que mejor se ajusta a los datos es la  $p_2(x)$ , ya que su error es menor.